The surface is undulating and is destitute of astrorhizal eminences or "mamelons;" but there are well-developed and much-branched astrorhizæ, the centres of which are placed 4–5 millim. apart. The astrorhizæ are not vertically superimposed in groups.

The skeleton-fibre is minutely porous and is incompletely reticulated, the radial pillars to a large extent preserving their distinctness. Hence in tangential sections (Pl. VIII. figs. 9 and 11) the cut ends of the radial pillars are more or less clearly recognizable as rounded or oval porous masses, united by irregular and exceedingly delicate connecting-processes. In vertical sections (Pl. VIII. fig. 10) the radial pillars are seen to be continuous from the top to the bottom of each latilamina—except when cut obliquely—and the spaces separating them are crossed by irregular transverse plates or "tabulæ," and represent the zoöidal tubes. About five or six pillars with their intervening tubes occupy the space of 2 millim. measured transversely. In tangential sections the zoöidal tubes appear as small rounded apertures in the skeletal network, and the branching astrorhizæ are well displayed.

Obs. Stromatopora antiqua presents us with a type in many respects intermediate between *Stromatopora*, Goldf. (as now defined), and *Syringostroma*, Nich. Though agreeing in general characters with the typical species of *Stromatopora*, the present form shows a strong relationship with *Syringostroma*, this being especially shown by the comparative distinctness of the radial pillars as definite structures. In the former genus, on the other hand, the vertical radial pillars are more or less undistinguishably merged with the horizontal connecting-processes, the skeleton thus becoming completely reticulate. None of my specimens of *S. antiqua* are in a state of thoroughly satisfactory preservation, and it is possible that the examination of more perfect specimens might show that the species is properly referable to *Syringostroma*, from the known species of which it could be readily differentiated. In the genus *Stromatopora* the present form presents most likeness to *S. typica*, Ros., from which it is separated by the more complete preservation of the radial pillars, the less perfect reticulation of the skeletal framework as seen in tangential sections, and the more markedly latilaminar mode of growth.

Formation and Locality. Niagara Limestone, Thorold, Ontario (*coll. H. A. Nicholson*). A poorly preserved specimen in dolomitic limestone of Niagara age from Durham, Ontario (*coll. Geol. Survey of Canada*), may also possibly belong to this species.

Stromatopora hudsonica, Dawson, sp.
(Pl. VIII. figs. 1–3.)

Caunopora hudsonica, Dawson, Quart. Journ. Geol. Soc. vol. xxxv. p. 52, pl. iv. figs. 9 *a* and 9 *b*, and pl. v. fig. 10 (1879).
Stromatopora hudsonica, Nicholson, Mon. Brit. Strom. p. 172 (1891).

Cœnosteum apparently massive, splitting easily into concentric strata, but not perfectly latilaminar in growth. The base and actual surface are unknown. Surfaces exposed by concentric fractures (Pl. VIII. fig. 3) show numerous minute and low protuberances or "mamelons," which are placed about 3 millim. apart, and each of which represents the centre of a small astrorhiza. The astrorhizæ are disposed in vertical systems, each of which is furnished with an axial wall-less tube, the aperture of which is placed at the summit of one of the small "mamelons" above mentioned. The intervals between these are occupied by innumerable small pores representing the mouths of the zoöidal tubes. Though the actual surface has not been observed, it may be taken as certain that its characters would be the same as those just described as distinctive of a concentric lamina within the mass of the cœnosteum.

The skeleton-fibre is minutely porous and about $\frac{1}{6}$ millim. in diameter, the skeletal tissue being completely reticulated and constituting a fine and close network. Tangential sections (Pl. VIII. fig. 1) exhibit the general skeletal network traversed by the branching horizontal canals of the astrorhizæ, and perforated by minute pores representing the transversely divided zoöidal tubes. Vertical sections (Pl. VIII. fig. 2) show recognizable radial pillars, about eight of which, with their intervening zoöidal tubes, occupy the space of 2 millim. measured transversely. The zoöidal tubes communicate freely by lateral apertures, and are furnished with few transverse partitions or tabulæ. Vertical sections also show very conspicuously the vertical wall-less axial canals of the astrorhizal systems.

Obs. This species, as I have elsewhere pointed out (Mon. Brit. Strom. p. 172), is very closely related to *S. typica*, Rosen, from which it is distinguished by the following more important characters:—

a. The astrorhizæ are regularly arranged in vertical systems, each system having an axial wall-less canal of comparatively considerable size.

b. As the result of the above, the surface shows nume-

rous minute pointed "mamelons," each of which is perforated at its summit by the aperture of the axial canal of one of the astrorhizal systems.

c. The centres of the astrorhizæ are considerably closer together than in *S. typica*, in which species they are usually from 5–6 millim. apart.

d. The zoöidal tubes are furnished with fewer tabulæ than those of *S. typica*, and also communicate more freely, giving to vertical sections a more lax and open aspect. The apparent scanty development of tabulæ may, however, be the result of poor preservation.

e. The skeleton-fibre is a little coarser and the skeletal network is not quite so fine as in *S. typica*.

Upon the whole therefore, and in view of the above-mentioned distinctions, I am disposed to regard *S. hudsonica* as a good species. It is, however, obviously closely related to *S. typica*, Rosen, and may be considered as representing this common European species in the Silurian rocks of the New World.

Formation and Locality. Silurian formation, Albany River, Hudson's Bay, and Cape Churchill. The fragments upon which the above description has been drawn up were furnished to me by Mr. Whiteaves, and the specimens from which they were taken were collected in 1878 by Prof. R. Bell. The specimen from Albany River is the one upon which Sir W. Dawson originally founded his *Caunopora hudsonica*; but its preservation is not so good as that of the example from Cape Churchill.

Stromatopora, sp.

(Cf. *S. bücheliensis*, Bargatzky, sp.)

Two specimens in the collection of the Geological Survey of Canada, from the Devonian rocks of Lake Winnipegosis, have the general aspect of *Stromatopora bücheliensis*, Barg., sp., and are probably referable to this species. Unfortunately the specimens in question are dolomitized, and their internal structure is so far altered that this reference cannot be regarded as free from doubt.

S. bücheliensis is distinguished from *S. Hüpschii*, Barg., sp., its nearest ally, by its comparatively fine skeleton-fibre and correspondingly close texture, and by the smaller size and greater remoteness of the astrorhizæ. I have elsewhere fully

described and figured this species (Mon. Brit. Strom. p. 186, pl. x. figs. 5–7, and pl. xxiii. figs. 4–7); and the Canadian specimens, from their poor preservation, necessarily afford nothing further to add to our information regarding the species.

Formation and Locality. The specimens which I am disposed to refer here are from the Devonian rocks of Lake Winnipegosis (Islands 50 and 56, Dawson Bay). Another specimen, from Snake Island, may perhaps be also referable to this species.

Stromatopora, sp.

(Cf. *Stromatopora Hüpschii*, Barg., sp.)

Two of the specimens collected by the officers of the Geological Survey from the Devonian rocks of Lake Winnipegosis belong to a species of *Stromatopora* in many respects similar to *S. Hüpschii*, Barg. Structurally these specimens agree with the latter common European and British type, and differ from *S. bücheliensis*, Barg., in their coarse skeleton-fibre, the lax reticulation of the skeleton, and the loose spreading form of the astrorhizæ. The internal structure of these specimens is, however, very poorly preserved, and it would be rash to refer them unreservedly to *S. Hüpschii*.

Formation and Locality. Dolomitic limestones of Devonian age, Lake Winnipegosis.

Stromatopora Carteri, Nich. (Pl. IX. figs. 5 and 6.)

Stromatopora Carteri, Nicholson, Mon. Brit. Strom. p. 174, pl. i. figs. 6 and 7, and pl. xxiii. figs. 1 and 3 (1886 and 1891).

The cœnosteum in this species is massive and irregular in shape and is composed of gently curved latilaminæ, while the upper surface is without "mamelons," and does not exhibit clearly developed astrorhizæ. The skeleton-fibre is thick and coarsely porous. Vertical sections (Pl. IX. fig. 6) show that each latilamina is composed of stout radial pillars, somewhat flexuous, and running continuously from the bottom to the top of each latilamina, and united into an open network by a few irregular connecting-processes. The zoöidal tubes are furnished with "tabulæ," and are separated by the radial pillars, about seven of which, with their intervening tubes, occupy a space of 2 millim. measured transversely. Tangential sections (Pl. IX. fig. 5) show a loose reticulate skeleton, perforated by the transversely divided zoöidal tubes, which may be

distinct or may become laterally confluent, and thus give rise to sinuous loops.

Obs. This species was originally based upon specimens from the Wenlock Limestone of Britain, and it has not hitherto been certainly recognized elsewhere. The Silurian rocks of Oesel yield, however, a closely allied form, which I have provisionally named *Stromatopora borealis*, and which I may figure and briefly describe here. These two forms agree with one another in the main details of their minute structure, but they differ, amongst other points, in their mode of growth and in the relative development of the astrorhizæ. In the typical *S. Carteri*, Nich., the cœnosteum is massive and astrorhizæ are altogether wanting or are most imperfectly developed; whereas in *S. borealis*, Nich., the cœnosteum is laminar and astrorhizæ are extensively developed. The single Canadian specimen which I possess is a fragment only; but it appears to be a portion of a massive specimen, and it shows no definite astrorhizæ, and I therefore refer it to *S. Carteri*.

Formation and Locality. The only Canadian example I have seen is from a loose boulder of Silurian age, from Hayes River, Hudson's Bay (*coll. R. Bell*, 1878).

Stromatopora borealis, Nich. (Pl. IX. figs. 7 and 8.)

The cœnosteum in this species forms flat laminar expansions, attaining when mature a diameter of several inches, with a thickness of from a centimetre or less to more than 2 centimetres. The under surface was covered by an epitheca, and was attached by a limited point to some foreign body. The skeleton-fibre is thick and coarsely porous, and the skeletal tissue is of the completely reticulate type, while the mode of growth is not latilaminar.

The surface exhibits vermiculate ridges, which inosculate with one another so as to form a coarse network corresponding with the reticulated skeleton, the elongated or rounded meshes of the network corresponding with the apertures of the more or less confluent zoöidal tubes. The surface also shows very well developed, ramified astrorhizæ, which do not open upon definite "mamelons," and which have their centres from 10 to 12 millim. apart.

Tangential sections (Pl. IX. fig. 7) show the vermiculate skeletal network, with sinuous and often elongated meshes representing rows of confluent zoöidal tubes. Vertical sections (Pl. IX. fig. 8) show stout, flexuous, radial pillars, united by irregular, oblique, and equally stout connecting-processes, and separated by the zoöidal tubes. About six pillars with their